Service Manual

& Parts List (without price)

DR-120LB (ZX-517C)
DL-200L (ZX-517A)
DL-210L (ZX-517B)
DR-320B (ZX-517D)

JULY 1996

DR-120LB

DR-320B

INDEX

CASIO®

CONTENTS

# 1. SPECIFICATIONS

Functions: 4 basic arithmetic operations (+, −, ×, ÷), constants for ×/÷, sub-total/total/grand total, item counting, ADD mode calculations, repeat calculations, memory calculation, percentage calculations and various kinds of practical calculations.

Decimal point: Full floating, and fixed (0, 1, 2, 3, 4, or 6) with round off, round-up cut-off.

Capacity: 12 digits

Ambient temperature range: 0 °C ~ 40 °C (32 °F ~ 104 °F)

Power supply: (AC 120 V, 100/120 V, 230/240 V)
Rated current and voltage are printed on the calculator.

Dimensions: 75.1 (H) × 212 (W) × 358 (D) mm
(3" H × 8 ³/₈" W × 14 ¹/₈" D) including roll-holder

Weight: 1.5 kg (3.3 lbs)

Consumable supplies: Printer ribbon (RB-02 or GB-02)
Roll papaer (Width 58 × 60 ø mm)

The AC outlet must be located near the unit and must be easily accessible.

2. BLOCK DIAGRAM
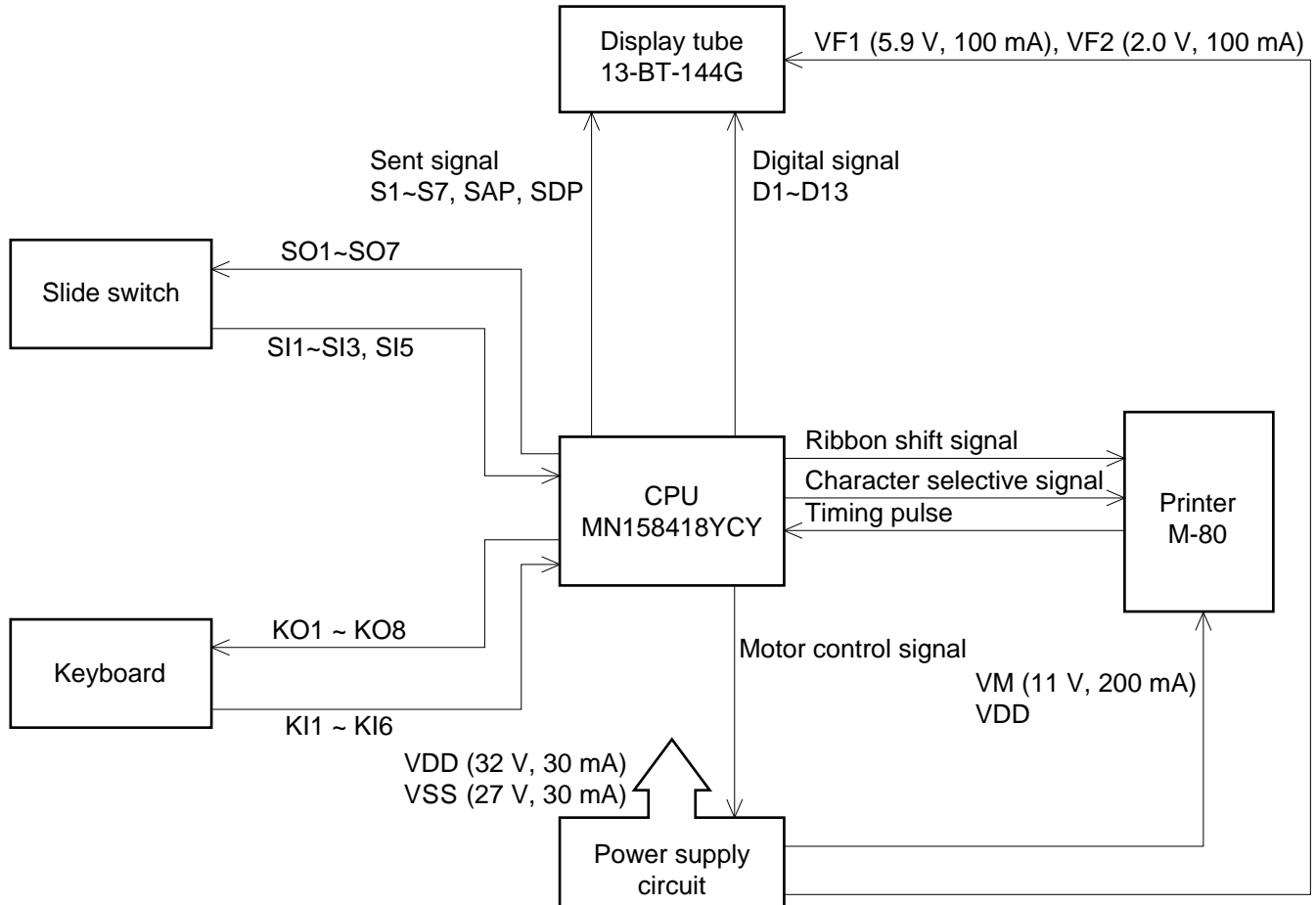
3. CPU (MN158418YCY) PIN FUNCTION

Pin No.	Signal	I/O	Function
1 ~ 7, 64	P00 ~ P13	Out	Common signal for keyboard
8 ~ 12	P20 ~ P22, P32, P33	In	Key signal from keyboard
13	IRQ	In	Timing pulse signal from printer
14	DEBIN	In	Reset pulse (Not used)
15	IRQCNT	In	Auxiliary timing (VDD)
16	P40	Out	Motor control signal
17	P41	Out	Ribbon shift signal for printer
18 ~ 30	P42, P43, P50 ~ P53, P70 ~ P73, P80 ~ P82	Out	Character selective signal for printer
31, 32	P83, P90	Out	Segment signal for display, Character selective signal for printer
33 ~ 39	P91 ~ P93 PA0 ~ PA3	Out	Common signal for slide switch, Segment signal for display
40	P60	In	Input port (VDD)
41 ~ 43	P61 ~ P63	In	Signal from slide switch
44 ~ 56	PB0 ~ PB3, PC0 ~ PC3, PD0 ~ PD3, PE0	Out	Digit signal for display
57	VPP	In	GND terminal
58	VDD	In	VDD terminal (+32 V)
59, 60	OSC1, OSC2	I/O	Clock signal for CPU
61	VSS	In	VSS terminal (+27 V)
62	SYNC	—	Not used
63	RST	In	Signal from slide switch, Reset signal

4. DIAGNOSTICS

STEP	MODE SWITCHES			OPERATION	DISPLAY	PRINT	NOTE
1	ON	F	6	`1` `0` `00`	1000.		
2	ON	F	6	`C`	0.		
3	ON	F	6	`8` `−` `÷` `9` `%` `◊/#`	−888.888888888	[−]	The character with "[ ]" will be printed by red ink.
4	ON	F	6	`▶`	−888.88888888	[888·888888888]	
5	PRINT	F	6	`CA`	0.	··0··	
6	PRINT	F	6	`1` `2` `3` `4` `÷`	1234.	1,234· ÷	
7	PRINT	F	6	`7` `6` `5` `+`	1.61307189542	765· = 1·61307189542 +	
8	PRINT	CUT	6	`M+`	M 1.613071	1·613071 M+	
9	PRINT	UP	4	`M+`	M 1.6131	1·6131 M+	
10	PRINT	UP	3	`M−`	M 1.614	[1·614 M−]	
11	PRINT	UP	2	`÷` `5` `MU/MD`	M 1.54	1·614 ÷ 5· M% 0·08 −% 1·54	
12	PRINT	5/4	1	`+`	M 3.1	1·5 + 2· +	
13	PRINT	5/4	0	`+`	M 5.	1·613 M◊	
14	PRINT	5/4	ADD×	`M◊`	1.613		
15	PRINT	5/4	ADD×	`M☀`	1.613	1·613 M*	
16	PRINT	5/4	ADD×	`CA` `1` `÷` `÷` `1` `=`	K 0.01	··0·· 1· ÷ 1· K÷ 0·01 ÷ 1· = 0·01	
17	PRINT	5/4	ADD+	`×` `1` `−` `1` `−`	−0.02	0·01 × [− 1· =] [− 0·01 +] [0·01 −] [− 0·02 ◊]	
18	PRINT	5/4	ADD+	`◊/#`	−0.02	002	
19	ITEM+	5/4	ADD+	`◊/#`	−0.02	[− 0·02 ◊] [0·01 −] 001	
20	ITEM+/−	5/4	ADD+	`−` `☀`	−0.03	[− 0·03 *] 001	
21	ITEM+/−	5/4	ADD+	`G☀`	−0.03	[− 0·03 G*]	
22	ITEM+/−	5/4	ADD+	`FEED`		Paper feeding	Press the button 3 seconds continuously.
23	OFF				NO Display		

— 3 —

5. TROUBLESHOOTING

Trouble	Cause	Checkpoint	Note
1) Does not work at all.	• Defective power transformer	Secondary voltage of transformer	VDD, VSS, VM, VF1, and VF2 are OK?
	• Defective LSI	Waveforms of each pin	
2) No display.	• No voltage at VF1, VF2	VF1, VF2	
	• No digit signal or no segment signal	Signal D1 ~ S1 ~	Check the pulse signals from LSI.
	• Defective display tube		If VF1, VF2, Digit and Segment signals are OK.
3) No print.	• Poor voltage VM		VM = 11 V±5 % (while printing)
	• Defective motor		
4) Poor display.	• Defective LSI		
	• Short or open circuits between digit signals and segment signals.	Between LSI and display tube	
	• Defective display tube		
5) Poor printing • Motor does not stop. • Missing of digits.	• Timing signal is bad.		Check detector of printer block and timing signal.
	• Defective printer magnet		
	• Refer to the printer service manual published separately.		
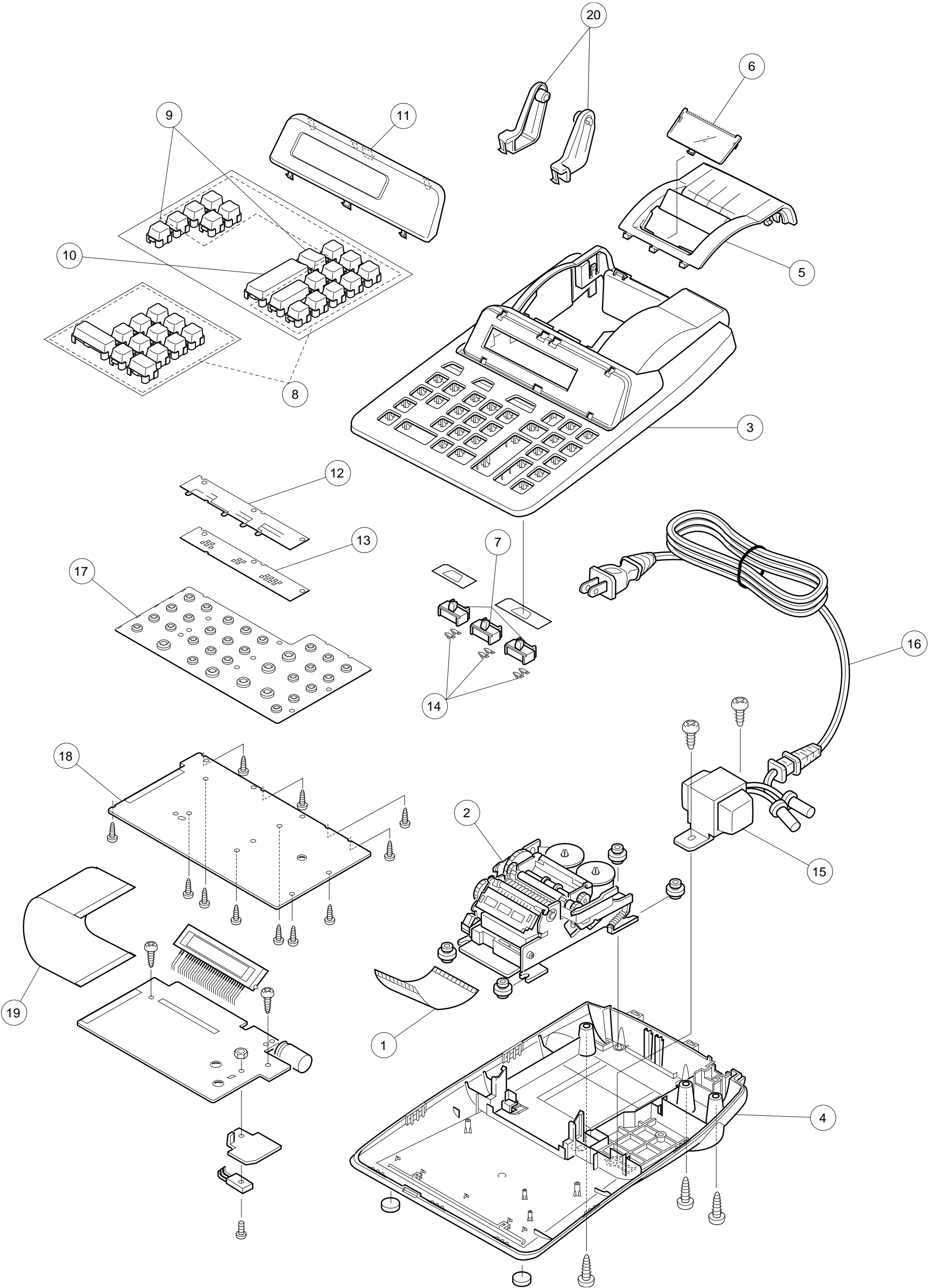
7. SCHEMATIC DIAGRAMS

7-1. Main PCB
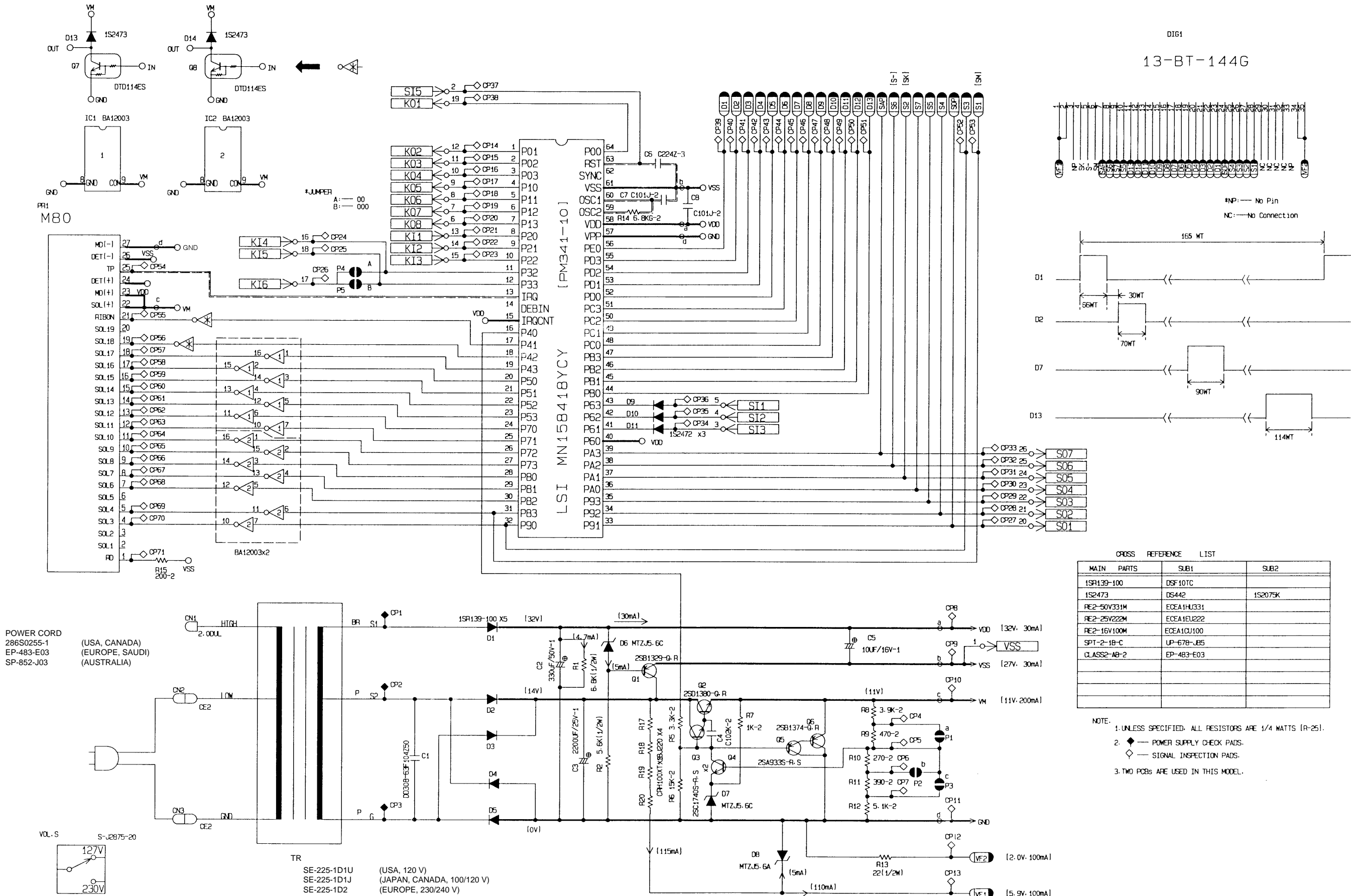
7-2. Keyboard PCB

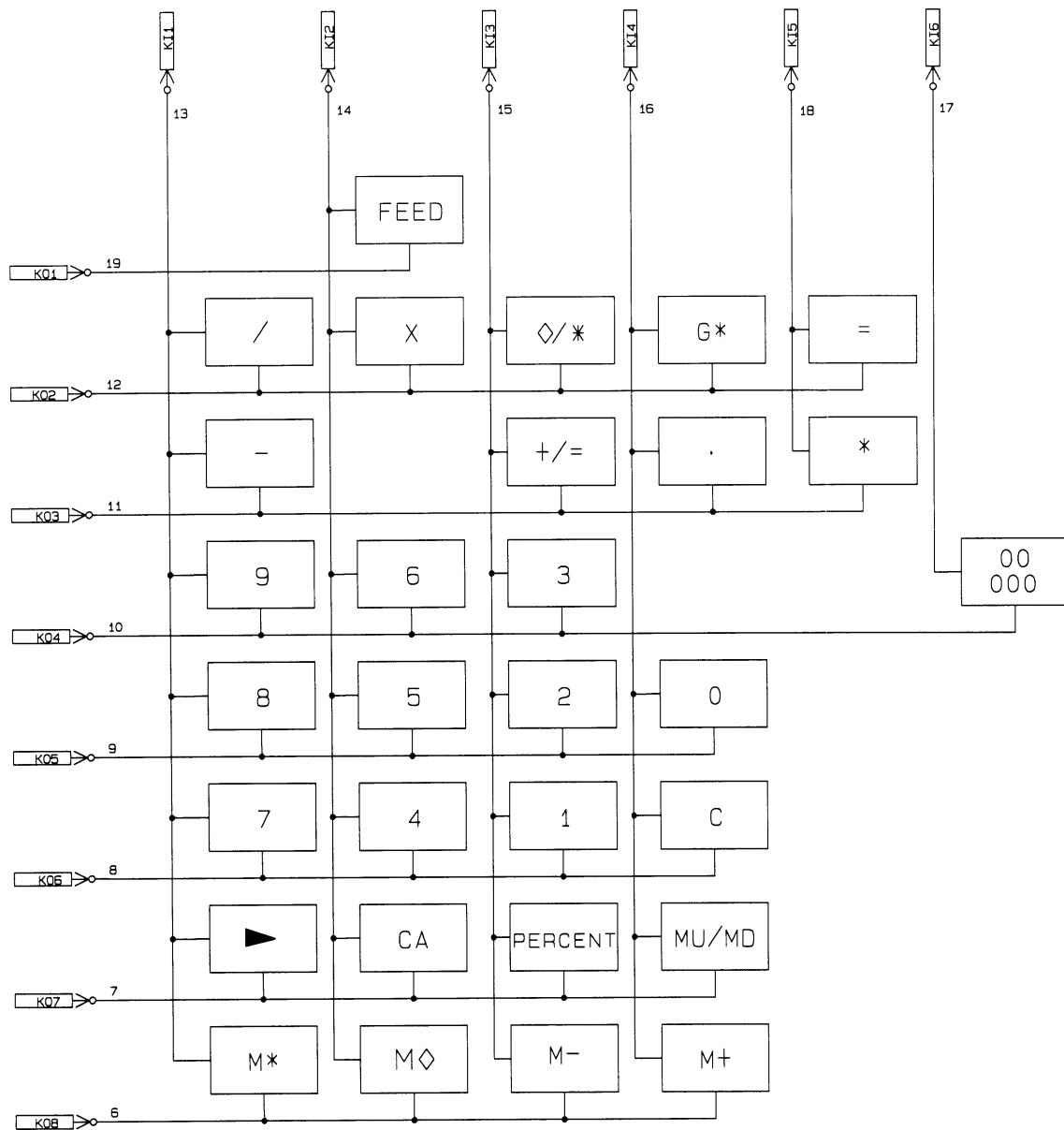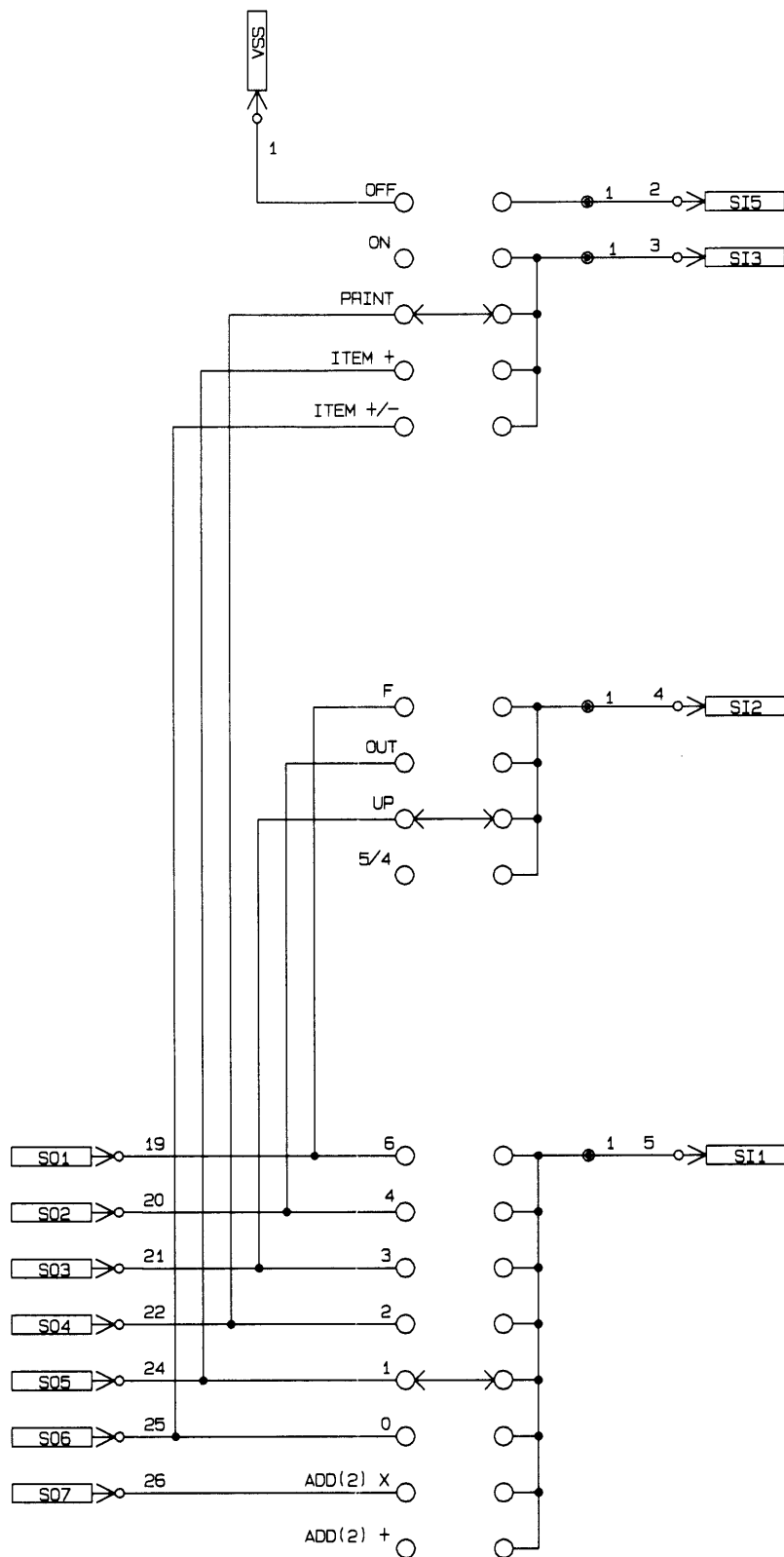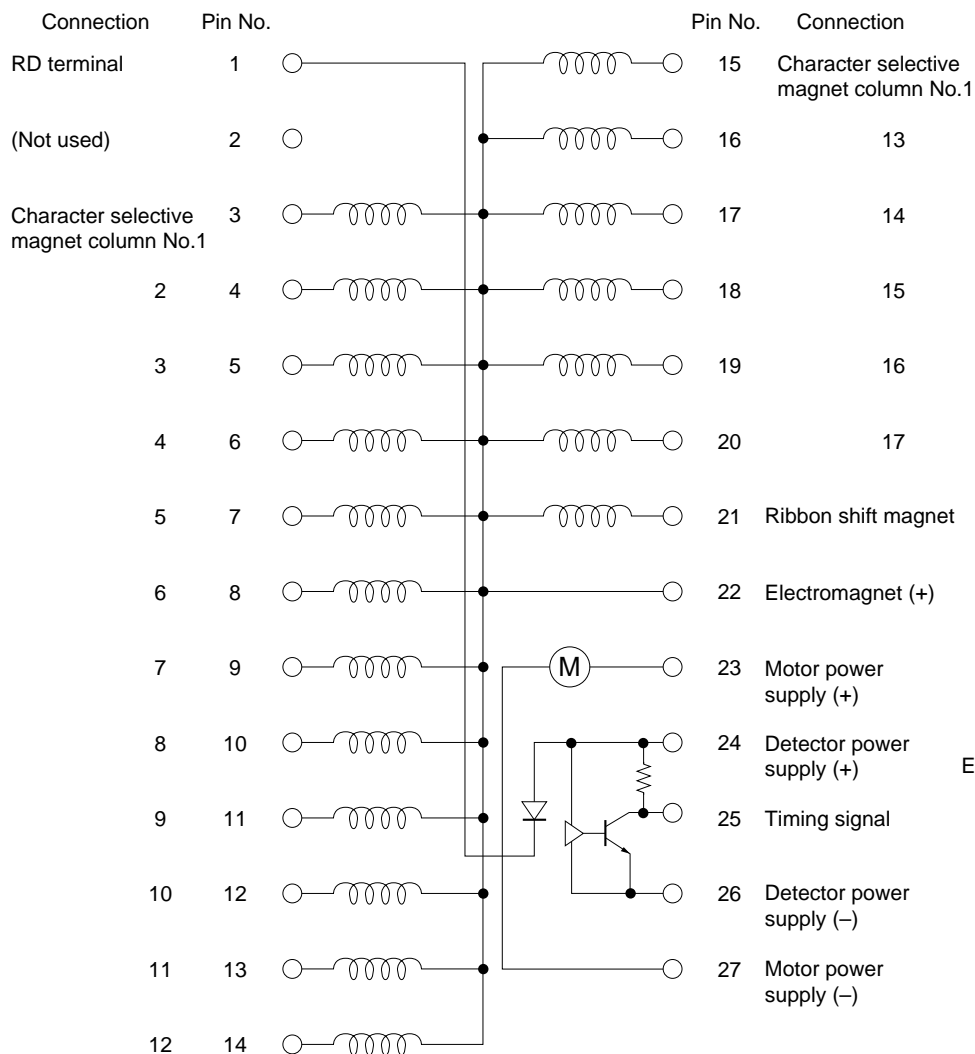## 7-3. Slide Switch Board PCB

7-4. Printer Pin Arrangement Diagram

Connection	Pin No.		Pin No.	Connection

Connection — Pin No. ... Pin No. — Connection

RD terminal — 1 ... 15 — Character selective magnet column No.1

(Not used) — 2 ... 16 — 13

Character selective magnet column No.1 — 3 ... 17 — 14

2 — 4 ... 18 — 15

3 — 5 ... 19 — 16

4 — 6 ... 20 — 17

5 — 7 ... 21 — Ribbon shift magnet

6 — 8 ... 22 — Electromagnet (+)

7 — 9 ... 23 — Motor power supply (+)

8 — 10 ... 24 — Detector power supply (+)

9 — 11 ... 25 — Timing signal

10 — 12 ... 26 — Detector power supply (−)

11 — 13 ... 27 — Motor power supply (−)

12 — 14

Notes:
1. Column numbers match the physical arrangement of the columns on the print wheels.
2. Column numbers are assigned from 1 to 18 from the frame motor side.
3. Pin numbers are assigned from 1 to 27 from the frame motor side.
4. The spark arrestor diode is connected as shown below.

Electromagnet (+) ————— Driver

(Example of compatible diode: 1S2075K or equivalent)

Motor power ON/OFF — 0.2ms max. *1

Timing signal — T0 T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 — TS T(0)

*2 — 8.0ms min. — 0.7ms max. — 0.7ms max. — 80.0ms min. — 2.0ms min.

Character selective magnet No.n — 8

0.7ms max. — 0.7ms max.

Ribbon shift magnet

(Print operation)

(Normal paper feeding operation)

Typ. 285.7ms
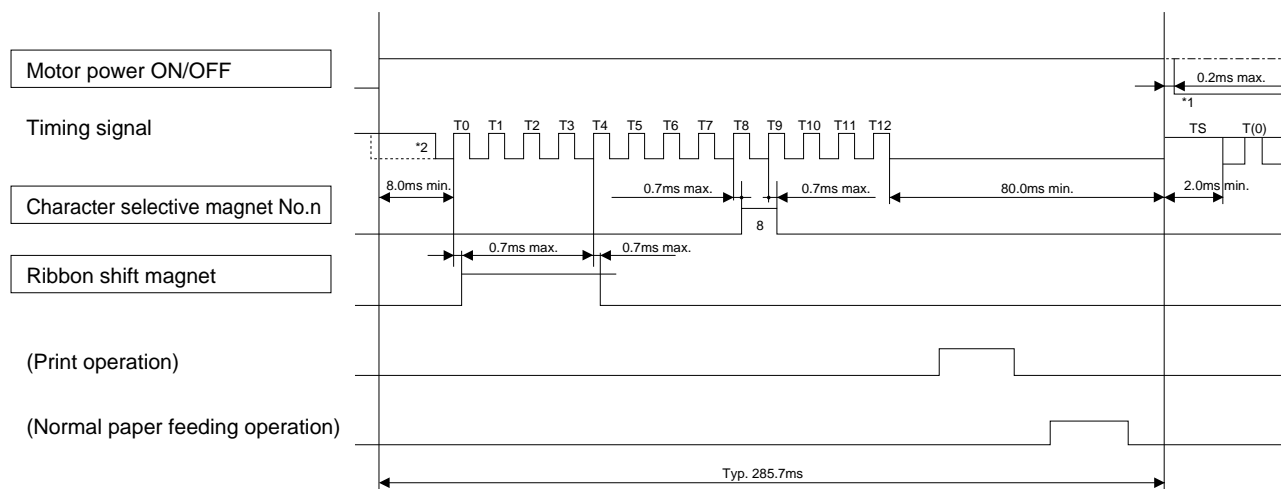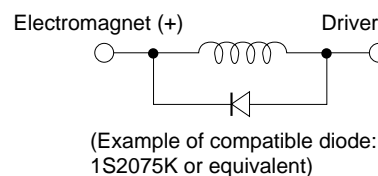
Notes:
1. The signals in ☐ must be prepared by the user.
2. The pulse is indicated by a dot-dash line (*1) is generated for continuous printing. The next print cycle can start immediately after the leading edge of the timing signal Ts.
3. As shown by a dashed line (*2), the timing signal may go low at motor power-on or upon reception of a Print command.

8. PARTS LIST

N	Item	Code No.	Parts Name	Specification	Q A	Q B	Q C	Q D	R
	LSI	2012 1295	LSI	MN158418YCY	1	1	1	1	B
	IC1, 2	2114 2436	Monolithic IC(Buffer)	BA12003	2	2	2	2	B
	Q1	2251 0525	Transistor	2SB1329-Q,R	1	1	1	1	B
	Q2	2253 0469	Transistor	2SD1380-Q,R (ROHM)	1	1	1	1	B
	Q3, 4	2252 0896	Transistor	2SC1740S-R,S	2	2	2	2	B
	Q5	2250 0672	Transistor	2SA933S-R,S	1	1	1	1	B
	Q6	2251 0581	Transistor	2SB1374-Q,R	1	1	1	1	B
	Q7, 8	2259 1449	Digital transistor	DTD114ES	2	2	2	2	B
	D1~5	2390 0378	Diode	1SR139-100T-32-T	5	5	5	5	C
	D6~8	2360 1946	Zener diode	MTZJ5.6CT-77-T	3	3	3	3	C
	D9~11	2301 0054	Diode	1S2472-T-77-T	3	3	3	3	C
	D13, 14	2301 0101	Diode	1S2473-T-77-T	2	2	2	2	C
	DIG1	3301 0217	Display tube	13-BT-144G	1	1	1	1	A
			The following elecrical parts will be not supplied from CASIO.						
	C1	2845 3241	Semiconductive capacitor	DD308-959F104Z50	1	1	1	1	
	C2	2803 9198	Electrolytic capacitor	RE2-50V331M-T2	1	1	1	1	
	C3	2803 8199	Electrolytic capacitor	RE2-25V222M-T50	1	1	1	1	
	C4	2813 3178	Semiconductive capacitor	DD003-298B102K50	1	1	1	1	
	C5	2803 9197	Electrolytic capacitor	RE2-16V100MA-T2	1	1	1	1	
	C6	2845 2170	Semiconductive capacitor	DD308-959F224Z12	1	1	1	1	
	C7, C8	2813 3038	Semiconductive capacitor	DD003-298SL101J50	2	2	2	2	
	R1	2606 1351	Carbon film resistor	R-50X-6.8K-J-T24-T (6.8 Kohm, 1/2 W, ±5%)	1	1	1	1	
	R2	2606 2297	Carbon film resistor	R-50X-5.6k-J-T24-T (5.6 K, 1/2 W, ±5%)	1	1	1	1	
	R5	2614 0323	Carbon film resistor	R-25-3.3K-J-T24-T (3.3 Kohm, 1/4 W, ±5%)	1	1	1	1	
	R6	2614 0048	Carbon film resistor	R-25-15K-J-T24-T (3.3 Kohm, 1/4 W, ±5%)	1	1	1	1	
	R7	2614 0234	Carbon film resistor	R-25-1K-J-T24-T (1 Kohm, 1/4 W, ±5%)	1	1	1	1	
	R8	2614 0561	Carbon film resistor	R-25-3.9K-J-T24-T (3.9 K-2)	1	1	1	1	
	R9	2614 0579	Carbon film resistor	R-25-470-J-T24-T (470 ohm, 1/4 W, ±5%)	1	1	1	1	
	R10	2614 0471	Carbon film resistor	R-25-270-J-T24-T (270 ohm, 1/4 W, ±5%)	1	1	1	1	
	R11	2614 0188	Carbon film resistor	R-25-390-J-T24-T (390 ohm, 1/4 W, ±5%)	1	1	1	1	
	R12	2614 0749	Carbon film resistor	R-25-5.1K-J-T24-T (5.1 K-2)	1	1	1	1	
	R13	2621 6397	Carbon film resistor	R-50X-22-J-T24-T (22 ohm, 1/2 W, ±5%)	1	1	1	1	
	R14	2606 1344	Carbon film resistor	R-25-6.8K-G-T24-T (6.8 K, 1/2 W, ±5%)	1	1	1	1	
	R15	2614 1311	Carbon film resistor	R-25-200-J-T24-T (200 ohm, 1/4 W, ±5%)	1	1	1	1	
	R17~R20	2775 3264	Metal film resistor	RSMF1B220J (100 ohm, 1 W, ±5%)	4	4	4	4	
	COMPONENTS								
N	1	6419 4320	PC joiner B-V298	HA310361-2	1	1	1	1	C
N	2	1014 9622	DIGITAL PRINTER	M-80-021	1	1	1	1	A
N	3	6419 4130	UPPER CASE-Z517A	HA110103-1	1	0	0	0	X
N	3	6419 4140	UPPER CASE-Z517B	HA110103-2	0	1	0	0	X
N	3	6419 4150	UPPER CASE-Z517C	HA110103-3	0	0	1	0	X
N	3	6419 4310	UPPER CASE-Z517D	HA110103-4	0	0	0	1	X
N	4	6419 4160	LOWER CASE-Z517A	HA110104-1	1	0	0	0	X
N	4	6419 4170	LOWER CASE-Z517B	HA110104-2	0	1	0	0	X
N	4	6419 4180	LOWER CASE-Z517C	HA110104-3	0	0	1	1	X
N	5	6419 4660	PRINTER COVER-Z517A	HA110106-1	1	0	0	0	C
N	5	6419 4670	PRINTER COVER-Z517B	HA110106-2	0	1	1	1	C
N	6	6419 4200	PAPER CUTTER-Z517	HA210052-1	1	1	1	1	C
N	7	6419 4190	SLIDE SWITCH-Z517	HA210051-1	3	3	3	3	X
N	8	6419 4220	KEY A-Z517	HA110107-1	1	1	1	1	C

Notes: N – New parts
        Q – Quantity used per unit
        R – Rank

A: DR-120LB
B: DR-320B
C: DL-210L
D: DL-200L

N	Item	Code No.	Parts Name	Specification	Q				R
					A	B	C	D	
N	9	6419 3040	KEY B-Z517	HA310265-1	1	1	1	1	C
N	10	6419 3050	KEY C-Z517	HA310266-1	1	1	1	1	X
N	11	6419 3020	DISPLAY PLATE-Z517A	HA1101105-1	1	1	1	1	X
N	12	6419 4240	C FILM-517	HA310352-1	1	1	1	1	X
N	13	6419 4250	SW SPACER-Z517	HA310351-1	1	1	1	1	C
	14	6329 8310	CONTACT PLATE-G310	A45208-1	6	6	6	6	C
	15	3012 1337	TRANSFORMER	SE-225-1D1U (or T03411C)	1	1	0	0	B
	15	3012 1316	TRANSFORMER	SE-225-1D1J (or T03410D)	1	0	1	0	B
	15	3012 1323	TRANSFORMER	SE-225-1D2 (or T03412A)	0	0	1	1	B
N	16	3701 1114	POWER CORD	286S0255-1	1	1	1	0	C
N	16	3701 1106	POWER CORD	EP-483-E04	0	0	1	1	C
N	16	3701 1115	POWER CORD	SP-852-J03	0	0	1	0	C
N	17	6419 3030	RUBBER KEY-Z517	HA210062-1	1	1	1	1	C
N	18	4321 2280	PCB-Z517-2	HA210060-1	0	1	1	1	X
N	19	6419 4290	PC JOINER A-Z517	HA310361-1	1	1	1	1	X
			OTHERS						
	20	6416 8960	Roll arm R-L227B	P340017-2	1	0	0	0	A
	20	6416 8970	Roll arm L- L227B	P340024-2	1	0	0	0	A
N	20	6419 5000	Roll arm R-L227A	P340017-1	0	1	1	1	A
N	20	6419 5010	Roll arm L- L227A	P340024-1	0	1	1	1	A

The Parts prices will be informed separately by Parts Price List.

Notes: N – New parts
Q – Quantity used per unit
R – Rank

A: DR-120LB
B: DR-320B
C: DL-210L
D: DL-200L

— 11 —